

AMENDMENTS TO THE CLAIMS

This listing of claims replaces all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A computer-readable medium having computer-executable instructions for a client on a computer network to use a Web service to access, via a server, a database directory for discovering other Web services accessible on the network, the computer-readable medium comprising computer-executable instructions for:

receiving a description document from the server for describing a Web service which interacts with the server to discover other Web services listed in a database directory of Web services, the description document having:

class definitions for a generic object class;

a plurality of object type classes derived from the generic object class, wherein each of the plurality of object type classes corresponds to a type of object in the database directory of Web services;

a Web service class that includes a plurality of database operation methods defined within the Web service class, the plurality of database operation methods being defined for operating on instances of database objects within the database directory of Web services, wherein each of the plurality of database operation methods is defined for the generic object class, and wherein the Web service class is derived from a parent class; and

at least one flag statement identifying an object type; and

in response to receiving the description document, the client converting the description document from a schema-based language for describing Web services into an intermediate language for a runtime environment; and

generating a database access request message for performing a database operation on a selected object type in the database directory of Web services, including:

determining whether the selected object type is the object type identified by the flag statement;

if the selected object type is the object type identified by the flag statement, creating an object of the selected object type using the class definition for the selected object type in the received description document and generating a database operation method for the selected object type, the database operation method for the selected object type being based on one of the database operation methods defined for the generic object class; and

serializing the created object of the selected object type and including the serialized object in the request message.

2. (Original) A computer-readable medium as in claim 1, wherein the description document is in the Web Services Description Language.

3. (Previously Presented) A computer-readable medium as in claim 2, wherein the step of receiving includes the client converting the description document into a compiled software format.

4. (Original) A computer-readable medium as in claim 3, wherein the compiled software format is for an intermediate language for a computer runtime environment.

5. (Original) A computer-readable medium as in claim 1, wherein the database operation methods includes a search method.

6. (Original) A computer-readable medium as in claim 5, wherein the search method returns an array as search result.

7. (Original) A computer-readable medium as in claim 1, wherein the database operation methods includes at least one method with an array as an operand.

8. (Original) A computer-readable medium as in claim 7, wherein the at least one method is a create method.

9. (Currently Amended) A computer-readable medium having computer-executable instructions for a database server of a runtime environment platform to provide a Web service of discovering other web services Web services by accessing a database directory of Web services, comprising computer-executable instructions for:

receiving, at a Web service, a query from a client;

in response to receiving the query from the client, the Web service:

accessing source code having class definitions compiled into an intermediate language of a runtime environment;

converting the complied source code in the intermediate language of the runtime environment into a schema-based language for describing Web services in description documents; and

sending, in response to a query from a clientthe query from the client, a description document to the client in the schema-based language, the description document describing a Web service which interacts with the server to discover other Web services listed in a database directory of Web services, the description document containing:

class definitions for a generic object class;

a plurality of object type classes derived from the generic object class, wherein each of the plurality of object type classes corresponds to a type of object in the database directory of Web services;

a Web service class that includes a plurality of database operation methods defined within the Web service class, the plurality of database operation methods being defined for operating on instances of database objects within the database directory of Web services, wherein each of the plurality of database operation methods is defined for the generic object class and wherein the Web service class is derived from a parent class;

receiving a request message from the client for performing a requested database operation method, the request message including a serialized object for the requested database operation method;

deserializing the serialized object;

identifying an object type and parameters of the serialized object; and

accessing the database directory of Web services to carry out the requested database operation method based on the object type and parameters of the serialized object.

10. (Original) A computer-readable medium as in claim 9, having further computer-executable instructions for performing the step of returning a result of carrying out the requested database operation method.

11. (Original) A computer-readable medium as in claim 10, wherein the requested database operation method is a search method, and wherein the result of the requested database operation method includes an array.

12. (Previously Presented) A computer-readable medium as in claim 9, wherein the requested database operation method has an array as an operand, and the request message includes a plurality of serialized objects of different object types corresponding to elements of the array.

13. (Original) A computer-readable medium as in claim 9, wherein the description document is in the Web Services Description Language (WSDL).

14. (Original) A computer-readable medium as in claim 13, wherein the step of sending the description document includes converting a compiled code module into the description document.

15. (Original) A computer-readable medium as in claim 14, wherein the compiled code module is in an intermediate language for a runtime environment platform.

16. (Previously Presented) A computer-readable medium as in claim 9, wherein the step of accessing the database to carry out the requested database operation method includes communicating with a database server for the database directory of Web services.

17. (Previously Presented) A computer-readable medium as in claim 16, where communicating with the database server is according to a directory access protocol.

18. (Original) A computer-readable medium as in claim 17, wherein the database access protocol is the Lightweight Directory Access Protocol (LDAP).

19-27. (Cancelled)

28. (Previously Presented) A Web service as recited in claim 1, wherein the plurality of database operations includes one or more batch operations.

29. (Cancelled).

30. (Cancelled).

31. (New) A client computing system connected to a database directory over a computer network, the client system being configured to use a Web service to access, via a server, the database directory to discover other Web services accessible on the computer network, the client computing system comprising:

a processor; and

computer-readable medium having stored thereon computer-executable instructions that, when executed by the processor, cause the client computing system to:

receive a description document from the server for describing a Web service which interacts with the server to discover other Web services listed in a database directory of Web services, the description document having:

class definitions for a generic object class;

a plurality of object type classes derived from the generic object class, wherein each of the plurality of object type classes corresponds to a type of object in the database directory of Web services;

a Web service class that includes a plurality of database operation methods defined within the Web service class, the plurality of database operation methods being defined for operating on instances of database objects within the database directory of Web services, wherein each of the plurality of database operation methods is defined for the generic object class, and wherein the Web service class is derived from a parent class; and

at least one flag statement identifying an object type; and

in response to receipt of the description document, convert the description document from a schema-based language for describing Web services into an intermediate language for a runtime environment; and

generate a database access request message for performing a database operation on a selected object type in the database directory of Web services, including:

determining whether the selected object type is the object type identified by the flag statement;

if the selected object type is the object type identified by the flag statement, create an object of the selected object type using the class definition for the selected object type in the received description document and generating a database operation method for the selected object type, the database operation method for the selected object type being based on one of the database operation methods defined for the generic object class; and
serialize the created object of the selected object type and including the serialized object in the request message.

32. (New) A server computing system connected to a database directory and a client computing system over a computing network, the server computing system being configured to enable the client computing system to discover Web services by the database directory, comprising:

a processor; and

computer-readable media having stored thereon computer-executable instructions that, when executed by the processor, cause the server computing system to access a Web service, the Web service being configured to:

receive a query from a client;

in response to receiving the query from the client:

access source code having class definitions compiled into an intermediate language of a runtime environment;

convert the complied source code in the intermediate language of the runtime environment into a schema-based language for describing Web services; and

send, in response to the query from the client, a description document to the client in the schema-based language, the description document describing a Web service which interacts with the server to discover other Web services listed in a database directory of Web services, the description document containing:

class definitions for a generic object class;

a plurality of object type classes derived from the generic object class, wherein each of the plurality of object type classes corresponds to a type of object in the database directory of Web services;

a Web service class that includes a plurality of database operation methods defined within the Web service class, the plurality of database operation methods being defined for operating on instances of database objects within the database directory of Web services, wherein each of the plurality of database operation methods is defined for the generic object class and wherein the Web service class is derived from a parent class;

receive a request message from the client for performing a requested database operation method, the request message including a serialized object for the requested database operation method;

deserialize the serialized object;

identify an object type and parameters of the serialized object; and

access the database directory of Web services to carry out the requested database operation method based on the object type and parameters of the deserialized object.